Duke | NICHOLAS SCHOOL of the ENVIRONMENT
Duke University Marine Lab

Ocean Evidence Gap Map (2020-2021)

WWF

BACKGROUND

What is Evidence Synthesis?
"The process of bringing together information from a range of sources and disciplines to inform debates and decisions on specific issues" (Royal Society 2018)

What are the challenges to doing evidence synthesis ?
Time, money, efficiency

Research Objectives

1. Efficiency Tests - Explore cost-effective approaches for developing and updating evidence maps & reviews
2. Evidence Map - Identify and describe the evidence base surrounding socio ecological outcomes of a broad range of conservation interventions

Why does machine learning matter?
Machine learning can help to lessen the challenges of evidence synthesis

Why is our project relevant?
Guide evidence-based decision-making and identify areas where more targeted research is needed, while also assessing software to make the process more efficient.

Research Question:
What are the social and ecological impacts of conservation interventions in tropical coastal marine ecosystems (TCMEs)?

TOOLS

Backward Citation Screening
- ❑ Search for overlap with similar reviews -- compare literature inclusion rates

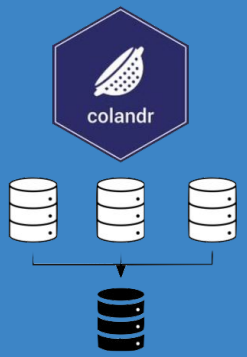
Topic Modeling
- ❑ A learning technique that is capable of scanning a set of documents, detecting word and phrase patterns, and automatically create subgroups of data to better characterize a set of documents

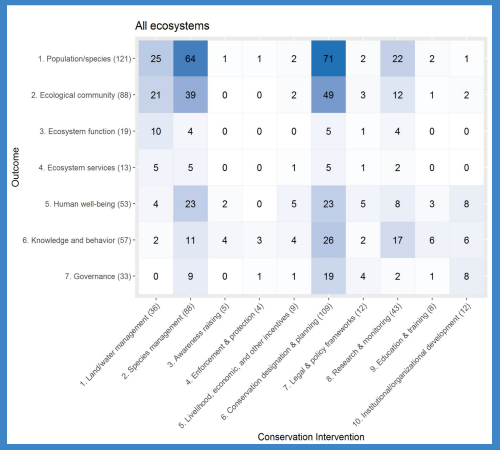
Supervised Learning -- Colandr
- ❑ Training colandr and testing the efficiency of colandr's algorithm
- ❑ Testing to see if machine learning makes literature reviews faster or better
- ❑ How Colandr works: it highlights words using our PICO, and learns & sorts based on what articles we include and exclude

APPLICATIONS

TROPICAL COASTAL MARINE ECOSYSTEM MAP
- ❑ The evidence gap map (as seen below, along with others) can direct further research into evaluating the evidence base, through systematic reviews and meta-analyses of results
- ❑ In a rapidly developing field of ocean science and conservation, evidence gap maps and synthesis can provide informed and data-based direction for scientific, philanthropic, and implementing organizations as they decide how to invest limited resources. Our research will be used by WWF in their conservation work in TCMEs.

EFFICIENCY TESTS
- ❑ Identify solutions to create more efficient systematic reviews (i.e. determine at what % of screened references we can stop screening with confidence)
- ❑ Assess the efficiency, performance, and usability of existing machine learning tools and approaches for evidence synthesis
- ❑ Co-develop an integrated assemblage of efficient and accessible tools and approaches [referred to as "evidence pipeline"] to support future evidence synthesis research across all disciplines





SOURCES

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Bass Connections: Ocean Evidence Gap Maps -- Created on April 15, 2021